

XX.—Contributions towards a Revision of the Genus  
*Lomanotus*. By NATHANIEL COLGAN, M.R.I.A.

WHILE dredging off Bullock Harbour, Dublin Bay, on the 6th October, 1906, what seemed to be a fairly successful haul was made in 10 fathoms low water. As there was a heavy rolling sea on, and our small boat was much too lively to permit of any careful sorting of the contents of the dredge, the whole haul was emptied into a bucket of sea-water. On landing soon after I observed floating near the surface of the water in the bucket a prettily frilled, rosy orange-coloured animal quite unfamiliar to me, yet obviously a nudibranch. It was transferred to fresh sea-water in a glass jar, when it immediately began to swim vigorously to and fro and up and down, with a rapid, lashing, serpentine motion of its flexible body, the thin foot-margins being drawn inwards and downwards so as to form a sharp keel favourable to quick and graceful navigation. For a nudibranch it had a singularly dashing manner. It darted rather than swam, as if it gave way to fits of petulance whenever it found its motion impeded by the translucent yet impenetrable walls of its prison. The animal lived in captivity for a day and a half, so that I had ample opportunity of observing it and drawing up the following tolerably minute description:—

Length of living animal fully extended  $1\frac{3}{4}$  inch. General colour of upper surface translucent rosy orange, of the sides paler, passing into whitish on the under surface, no distinct colour spots or blotches being apparent anywhere. Body elliptic-oblong, deep (not flat), gradually narrowed behind into a very short and ill-defined tail. Foot with two slender tentacular processes on each side in front, the anterior pair usually carried in a recurved or hooked posture. Dorsal tentacles or rhinophores two, bright yellow, club-shaped, obliquely laminated, suddenly narrowed above into short, blunt, cylindric-conic, smooth, white tips and rapidly retractile within long sheaths. Margin of the right-hand sheath (as one looks towards the head of the animal) divided into 4 (or 5?) irregular teeth or lobes, that of the shorter, left-hand sheath, simple or at most sinuate. Along each side of the back runs an erect, flexible, frilled process, the pleuropodium or pallial margin (*Rückengebräme* of Bergh), waved into three deep bays whose convexity points inwards towards the median line of the animal. The upper margin of this frill is cut into not very numerous tooth-like, flattish, triangular segments (branchial papillæ?) of unequal size, the longest occupying

the centre of each bay. The pleuropodium declines suddenly as it approaches the anterior extremity of the animal, yet persists as a distinct ridge until it reaches to and effects a junction with the base of the rhinophore-sheath; towards the posterior extremity it declines gradually, and becomes obsolete as it approaches the tail. The rosy orange of the body takes a deeper tone in the pleuropodium, yet the tips of the segments or papillæ are not distinguished by any marked difference of colour. The deep red viscera of the animal sending off branches (hepatic lobes) on either side to the pleuropodium are clearly visible through the pellucid tissues of the back. The mandibles when treated with caustic potash showed under a  $\frac{1}{4}$ -inch objective a finely cross-hatched or tessellated masticatory margin (*Kaurand* of Bergh). Under the same power the general character of the radula with its finely serrated teeth-margins was easily made out: unfortunately before the examination of this exquisitely constructed organ was completed it was lost by an explosive ebullition of the potash in which it was being boiled over a lamp-flame.

On comparing this description and the dead animal with Alder and Hancock's Monograph, it became clear that my capture belonged to the genus *Eumenis* instituted by these authors in 1845 and that it was structurally in close agreement with the species *E. marmoratus* as described and figured by them in that year. The genus *Eumenis* having been founded by Alder and Hancock in ignorance of the fact that an equivalent genus *Lomanotus* had been created by an Italian scientist a year earlier, they subsequently abandoned the name *Eumenis* in favour of *Lomanotus*. But close as was the resemblance of the Dublin Bay *Lomanotus* to *Lomanotus (Eumenis) marmoratus*, the differences in colour, size, and form were yet sufficient to raise doubts as to their identity. In the Monograph the rhinophore-sheaths of *L. marmoratus* are described as having simple margins, the pleuropodium is represented as disconnected from the sheaths and continued forward in advance of them, the animal is described as opaque and marbled with dark brown and white, while its length is given as little more than half an inch. It was obviously necessary to make a close study of the literature of the genus before venturing to decide whether the Bullock *Lomanotus* might safely be assigned to any of the established species or should be set down as nondescript.

The result of this study when made was to show the rarity of most of the species of *Lomanotus*, the necessarily meagre material on which some of the species had been founded, and the unsatisfactory nature of many of the specific distinctions

relied on. The following survey of the history of *Lomanotus* will serve to illustrate these points, and will also, it is hoped, furnish material for estimating the value of the revision of the genus which it is the main object of this paper to propose. In any case, this historical sketch can hardly fail to be useful to students of *Lomanotus*, as giving them a rather full *résumé* of the scattered and by no means easily accessible literature on the subject.

**1844.**—Giovanni Battista Vérany, of Genoa, describes in the August issue of the ‘*Revue Zoologique par la Société Cuvierienne*’ (tome vii. p. 303) a new genus of Nudibranch Mollusca to which he gives the name *Lomanotus*. The generic characters here published by Vérany are as follows:—  
 “Corps allongé, cunéiforme, gastéropode; tête aussi large que le corps, munie d’un voile frontal portant de chaque côté de petits prolongements tentaculiformes; deux tentacles dorsaux, retractiles, terminés en massue comme dans le *Doris* et logés chacun dans une espèce d’étui caliciforme; organes de la respiration formés par deux membranes minces et frangées, fixées de chaque côté entre la face dorsale de l’animal et les faces latérales; orifices de l’anus et des organes génitaux comme dans les *Tritonies*.”

In the month following this first publication of *Lomanotus* Vérany introduces the new genus to the special notice of Italian zoologists in a paper on the Nudibranchs of Liguria read by him at the Sixth Congress of Italian Scientists held at Milan. In the report of this Congress, published in Italian at Milan in 1845 (‘*Atti della Sesta Riunione degli Scienziati Italiani tenuta in Milano nel Settembre del 1844*’), an abstract is given of Vérany’s description of the new mollusc as read before the Congress. Here the original French description of the genus is improved on, notably as regards the branchial processes (the pallial curtain, epipodial ridge, or pleuropodium, as it has been variously termed). The branchiæ are here said to be in the form of a fringe irregularly festooned and toothed, attached longitudinally to the sides of the body and to the sheaths or calyces (“*con le branchie a frange irregolarmente festonate e dentate attaccate longitudinalmente ai lati del corpo ed ai calici*”). The abstract concludes with the statement that the species is dedicated to Prof. Gené (“*La specie è dedicata al Prof. Gené*”). Vérany at the meeting of the Congress in 1844 evidently described the species no less than the genus, and he clearly intended that the species should bear Gené’s name. As he did not, however, assign to the species, either at the Congress or in the

published report of its proceedings, the Latin binomial *Lomanotus genei*, a strict compliance with nomenclature rules will not permit of that name dating from 1845. It was not until 1846 that he definitely named the species *L. genei*.

**1845.**—Joshua Alder and Albany Hancock, in ignorance of the existence of Vérany's genus *Lomanotus*, found their genus *Eumenis* on a single specimen of a nudibranch  $\frac{1}{2}$  inch long dredged in deep water near Berry Head, Torbay. The generic characters of *Eumenis*, as first published in the Ann. & Mag. Nat. Hist. for November 1845 (vol. xvi. p. 311), are substantially the same as those of Vérany's *Lomanotus*. This was acknowledged by Alder and Hancock in the section of their famous 'Monograph of the British Nudibranchiate Mollusca' which appeared in 1854, where they concede precedence to Vérany's name for the new genus. A full specific description of the Berry Head nudibranch was published along with the generic characters of *Eumenis*, the species being named *E. marmorata*. This was not only the first species of the genus detected in the British Isles, but was also the first anywhere named, described, and published in strict conformity with nomenclature rules. The Monograph gives coloured plates of *E. marmorata* in which the rhinophore-sheaths are shown with entire margins, while the pleuropodium is represented as disconnected from the sheaths and passing round their bases to the front of the animal. The prevailing colour of the body is shown as brown marbled with white. The following passage in the Monograph may be taken as disclaiming perfect accuracy for either the description or the figure of the animal:—"It was a little injured and lived only a short time after being brought on shore, so that we had no opportunity of observing its habits, and the drawing and description are consequently not so perfect as we could have wished."

**1846.**—Vérany, in a Guide to Genoa, published in that city, gives a Catalogue of the Marine Invertebrates of the Gulf of Genoa and Nice ('Catalogo degli Animali invertebrati marini del Golfo di Genova e Nizza'). In this Catalogue (pp. 24-25) appears for the first time a full description of the species he had previously (at the Milan Congress) dedicated to Prof. Gené. At the head of the description the animal is named in Italian *Lomanoto di Gené*, but the omission to supply in the text a valid Latin binomial is made good in figure 6 of plate ii. at the end of the Catalogue, where the name *Lomanotus genei* appears beneath a tolerably good out-

line of the animal. A full rendering of the Italian description is here given:—

Body elongate wedge-shaped, the back somewhat convex. Branchiæ adhering anteriorly to two annulated caliciform sheaths with a four-toothed aperture, the sheaths including the two dorsal tentacles, which are club-shaped and furnished with small, parallel, oblique laminae. Foot narrow, with an anterior marginal groove. Aperture of the genital organs on the right side and far forward, anus on the same side and placed far backward. Colour intense wine-red, dotted with white, variable by reason of its transparency, which allows the internal parts of a darker red to show through. Length 60<sup>m</sup>. Fished up rarely from a depth of 200–250 metres, in consequence of which the animal is only obtained dead [or? and?] more or less imperfect, as it is very soft (“onde non si ottiene se non morto più o meno imperfetto, perché è molto floscio”).

In this same year (1846) Alder and Hancock describe, in the *Ann. & Mag. Nat. Hist.* for November (vol. xviii. p. 293), a second species of their genus *Eumenis* (afterwards acknowledged by them to be equivalent to *Lomanotus*) from a single specimen  $\frac{1}{4}$  inch long taken in from 3 to  $\frac{1}{2}$  fathoms in Lamash Bay. This species they name *E. flavida*. The colour of the body is yellow, with brown spots, the sheath-margins are tubercled, and the pleuropodium is indistinct, its place being marked, or, rather, suggested, by a line of small papillæ along each side of the body, marked off at intervals by isolated larger papillæ. In the sixth part of the *Monograph*, which appeared in 1854, this species is figured and named *Lomanotus fluvidus*.

**1860.**—William Thompson describes, in the *Ann. & Mag. Nat. Hist.* (ser. 3, vol. v. p. 50), a third British species of *Lomanotus*, making, with Vérany's *L. genei*, the fourth species of the genus so far detected. The description of this new species, which he names *L. portlandicus*, is founded on two specimens each  $1\frac{3}{4}$  inch long dredged at Weymouth, one in 1855, the other in 1856. In colour this species differs from the three previously described, the body being pellucid white, tinged with brownish yellow on the back and pale orange-red in front; the sheath-margins are divided into six finely pointed filaments, and the pleuropodium commencing in front of the sheath-bases continues “behind the termination of the tail.” In the absence of any figure it is impossible to clear up the obscurity of this description of the pleuropodium as continuing behind the termination of the tail.

**1877.**—Rev. A. M. Norman describes, in the *Ann. & Mag. Nat. Hist.* (ser. 4, vol. xx. p. 518), a fourth British species, which he names *L. hancocki*. The description is drawn up from a single specimen  $2\frac{1}{4}$  inches long, dredged off Berry Head, Torbay, in 1875. In colour the animal is of a light pinkish orange and very transparent, so that the internal organs show clearly through the skin; the rhinophores are quite destitute of laminae and so short as scarcely to exceed the sheaths, which latter terminate above in a calyx-shaped expansion formed of five leaf-like points. It seems clear that this description of the rhinophores was drawn up at a time when they were fully retracted, their smooth tips alone being visible above the sheath-margins. It is admitted that the rhinophores were not dissected out in this case\*.

**1878 and 1883.**—Dr. Rudolph Bergh, of Copenhagen, makes an important contribution to our knowledge of the genus in his well-known “*Beiträge zur Kenntniss der Acolidiaden*” (*Verhandl. der zool.-botan. Gesellschaft in Wien*, 1878, p. 553, and 1883, p. 66), in which he gives an exhaustive description with anatomical plates of *L. genei*, founded on an examination of two specimens, one  $1\frac{1}{2}$  inch long dredged in the Bay of Naples and preserved in spirit, the other a living specimen  $1\frac{1}{2}$  inch long dredged in the Adriatic near Trieste. In so far as they deal with obvious features, both Vérany’s (1846) and Bergh’s descriptions agree closely, the only differences being as to colour and degree of opacity dependent on colour. While the wine-red of Vérany’s animal allowed the dark red viscera to appear through the body, the purple of Bergh’s concealed them (“*Die Eingeweide schimmerten nirgends hindurch*”).

**1883.**—At the meeting of the Academy of Physical and Mathematical Sciences of Naples held on the 10th March Signore S. Trinchese reads a paper entitled “*Di una nuova forma del genere Lomanotus e del suo sviluppo.*” This paper, which does not appear to have received, at least in the British Isles, the consideration it merits, is published in the ‘*Rendiconti*’ of the Academy for 1883 (Anno xxii. pp. 92–94), and gives not only a full description of the new *Lomanotus* from a mature specimen, but also a most valuable account of the development to maturity of a young individual measuring scarcely  $1\frac{1}{2}$  inch (2 mm.). Both specimens were

\* See Garstang’s “*Nudibranchiate Mollusca of Plymouth Sound,*” *Journ. of Marine Biol. Assoc. of United Kingdom*, vol. i.

taken in the Bay of Naples at a depth of 40 mètres in association with the common hydroid *Antennularia ramosa*, and the younger individual was kept alive in an aquarium and nourished on the hydroid for the space of a month. Trinchese, struck by the peculiar aspect of the adult animal  $\frac{11}{12}$  inch long (he speaks of it as "singolarissimo"), gives a full description of its outer features, with some anatomical details, and proposes for the new *Lomanotus* the name *L. eisigii*. In its general features, as here described, *L. eisigii* agrees very closely with Vérany's *L. genei*, but the peculiar caudal extension of its pleuropodium at once distinguishes it from Vérany's and from all other previously described species of the genus. The following is a close rendering of the passage in which Trinchese describes the pleuropodium of *L. eisigii*:—

On each side of the back is placed vertically a thick membrane, which, beginning at the outward side of the base of the rhinophore, ends near the apex of the tail. Here the membrane of one side uniting with that of the other forms a broad fin, which is the principal swimming-organ. The posterior margin of this fin is furnished with small triangular papillæ. ("Quivi la membrana di un lato unendosi a quella dell'altro forma una larga pinna che è l'organo principale del nuoto. Il margine posteriore di questa pinna è munita di piccole papille triangolari.")

The margins of the rhinophore-sheaths are described as having five unequal papillæ, the body is transparent white marked with irregular opaque white blotches and red dots. The tips of the papillæ on the head, on the sheath-margins, on the pleuropodium, and on the caudal fin are opaque white, the upper third of their length being orange-yellow.

In the second section of his paper, entitled "Descrizione dell'individuo in via di sviluppo," Trinchese traces the development of the young specimen which he nourished for a month on the cœnosarc or living substance of *Antennularia*. The importance of the observations here recorded and the probability that Trinchese's paper may have been overlooked by students of the nudibranchs in this country will, perhaps, justify the somewhat lengthy extracts from it now given.

At first, says Trinchese, this individual had a form so different from that of the adult that I took it for a young member of the family of the Eolididæ. From the anterior margin of the head sprouted two short tentacles, and behind these rose the two rhinophores, laminated for almost their whole length and entirely destitute of sheath. On each side of the back were fixed four conical papillæ disposed in a

longitudinal series. Each papilla contained a well-developed hepatic lobe, which extended almost to the apex of the papilla. The body of the animal ended behind in a long and depressed tail similar to that of the Eolididæ. There was no trace of a caudal fin.

The first modification which appeared in the form of the animal was the lengthening of that portion of the body comprised between the first and the second of the dorsal papillæ. Next, the base of the first papilla swelled up, forming a semi-lunar curved cushion with the concavity turned towards the rhinophore. Little by little this cushion completely embraced the rhinophore and increased in height until it enveloped the lower two-thirds of that organ, and thus formed its sheath. The upper third of the first dorsal papilla, whose lower two-thirds had been transformed into the sheath, preserved its shape and its orange-yellow colour and formed the posterior papilla of the sheath-margin. Then four other papillæ sprouted out ("spuntarono") from this sheath-margin.

Meanwhile that portion of the body lying between the second and the third of the dorsal papillæ and that between the third and the fourth lengthened day by day, and at the same time the bases of these papillæ became depressed from without inwards, and from the free margin of the depressed part sprouted small papillæ. Finally, the lower two-thirds of each papilla were transformed into a triangular arched membrane with the concavity turned outwards. The upper angle of this membrane was formed of the upper one-third of the original papilla, which had retained its primitive form and its yellow colour.

The membranes formed from the inferior region of the primitive papillæ of each side of the animal became fused together, and at the same time there appeared at each side of the tail a longitudinal eminence, a fold of the skin in continuation of the membranous base of the last papilla. These folds grew in height and assumed a triangular form, and, meeting near the apex of the tail, formed the caudal fin.

These facts, concludes Signore Trinchese, shed a vivid light on the phylogeny of *Lomanotus*, and demonstrate its descent from an ancestor having the form of an *Æolid*.

**1889-1890.**—Mr. W. Garstang, in a paper on the Nudibranchiate Mollusca of Plymouth Sound, published in vol. i. of the 'Journal of the Marine Biological Association of the United Kingdom,' records two captures of *Lomanotus* at Plymouth, one of three specimens ranging from  $\frac{1}{2}$  to  $\frac{5}{8}$  inch in length made in 1889, another of eight specimens



ranging from  $\frac{1}{8}$  to  $\frac{1}{4}$  inch made in the following year. These specimens vary considerably in colour. Two of those captured in 1889 are marbled brown like *L. marmoratus*, the third and largest is much lighter in colour, a pale fawn tinged with red, while the specimens taken in 1890 are "pale translucent orange." The sheath-margins of the rhinophores vary too. They are simple in the smaller 1889 specimens, while the larger one has "five or six blunt prominences or tubercles." Of those captured in 1890, the larger specimens have sheath-margins "produced into 4, 5, or 6 somewhat irregular processes of either simple papilla-like digitate or compressed triangular form," the smaller specimens have the sheath-margins simple. From a study of these specimens and of the descriptions of the six species of the genus established by Italian and British authors Mr. Garstang is led to reduce all to a single species, to which he assigns Vérany's name *L. genei*. He considers that the form of the tentacle sheath-margin may vary in this genus as it appears to vary in the allied genus *Tritonia*, and attributes the absence of lobing in the margins of *L. marmoratus* to immaturity of the specimen described by Alder and Hancock. Garstang is the first to draw attention to the characteristic mode of swimming of this species by a lashing of its body from side to side.

**1892.**—Mr. F. W. Gamble describes, in the *Ann. & Mag. Nat. Hist.*, a nudibranch  $\frac{1}{2}$  inch long dredged in the preceding year in Plymouth Sound. It resembles *C. marmoratus* in colour, but the sheath-margins have five papillæ. Having kept this animal living for some weeks, he not only notes its peculiar mode of swimming, but observes that the papillæ both of the sheath-margins and of the pleuropodium are capable of contraction and dilation. Following Garstang's lead, he names this specimen *L. genei*.

**1896.**—Mr. Gamble records, in the 'Irish Naturalist' (vol. v. p. 133), the finding in the previous year at Valentia Harbour, S.W. Ireland, of a stranded specimen of *L. genei* 2 inches long.

**1900.**—Mr. W. I. Beaumont, in a Report on the Opisthobranchiate Mollusca of Valentia Harbour (*Proc. R. I. Acad. ser. 3, v. p. 842*), rejects Mr. Gamble's identification of the large specimen found stranded in 1895 with Vérany's *L. genei*. He places this Valentia specimen, as well as two other large specimens he had recently found at Plymouth, under Thompson's *L. portlandicus*, which he equates with Norman's

*L. hancocki*, but is unable to follow Garstang in uniting with these the *L. marmoratus* of Alder and Hancock. He retains this latter as a distinct species (though he hints that it may be merely a colour-variety); he unites with it *L. flavidus* and refers to its small specimens of a marbled brown *Lomanotus* found on several occasions at Valentia Harbour, as well as the Plymouth specimens named *L. genei* by Mr. Gamble in 1892 and the two smaller Plymouth specimens found by Mr. Garstang in 1889. Having discussed Mr. Garstang's views as to the reduction of the six species of the genus to one, he concludes that there are really two British species—the large pellucid *L. portlandicus* and the small marbled brown *L. marmoratus*, with which latter he combines *L. flavidus*. But while conceding specific rank to *L. marmoratus*, he abandons as accidental Alder and Hancock's structural character drawn from the form of the sheath-margins, and apparently bases its specific distinction solely on colour and size. As he has not had access to the original descriptions of either of the Mediterranean species, *L. genei* and *L. eisigii*, he hesitates to combine them positively with one or other of the two British species which he accepts, and merely suggests that these Italian forms may be placed under *L. portlandicus*.

**1903.**—Mr. G. P. Farran, in a paper on the Nudibranchiate Molluscs of Ballynakill and Bofin Harbours, Co. Galway ('Report on the Sea and Inland Fisheries of Ireland for 1901'), records the finding of numerous specimens of *Lomanotus* in Ballynakill Harbour in 1902. Of a small brown form no less than sixteen specimens were secured, the largest 2 cm. (or, say,  $\frac{4}{5}$  inch) long; of a larger, rich, clear reddish-coloured form two specimens were taken, one 5.5 cm. the other 4 cm. long. All of the specimens, large and small, had dentated sheath-margins and were taken in quite shallow water from 1 to 4 fath. Following Mr. Beaumont's lead Mr. Farran refers the two large specimens to *L. portlandicus* and the numerous smaller specimens to *L. marmoratus*.

With these West Galway records this rather lengthy survey of the history of *Lomanotus* may conclude. It remains only to review the evidence which it offers for or against the existence of six distinct species of the genus, and to state concisely the conclusions which the evidence appears to warrant.

If we take one of the species as standard, and compare with

its description the original descriptions of the remaining five, omitting most of the purely generic characters and all specific characters derived from colour, the evidence will present itself in its clearest form. None of the six species is better suited for this purpose than *L. genei*, as none has been more fully described from mature examples. Let this, then, be taken as the standard, and the following table will exhibit all the structural differences which can be adduced as justifying the retention of the remaining five species. Vérany's character of the genus, drawn from the 'Revue Zoologique' of 1844 and the Acts of the Milan Congress of the same year, published in 1845, is placed at the head of the table for reference.

LOMANOTUS, Vérany (1844).

Body oblong, wedge-shaped: head as wide as the body, furnished with 4 small tentaculiform prolongations; dorsal tentacles 2, retractile, club-shaped, laminate, each included in a calyciform sheath: branchiæ formed of 2 irregularly fringed and festooned membranes, attached longitudinally one to each side of the dorsal surface and to the tentacle-sheath: anal and genital orifices on the right side.

- L. genei*, Vérany.—Sheath-margins 4-lobed: pleuropodium reaching almost to the tail on either side.
- L. marmoratus* (Alder & Hancock).—Sheath-margins entire; pleuropodium not connected with the sheaths, but produced forwards in front of them.
- L. javidus* (Alder & Hancock).—Sheath-margins tubercled; pleuropodium indistinct, its place marked by a marginal series of unequal-sized papillæ.
- L. portlandicus*, W. Thompson.—Sheath-margins divided into six finely pointed filaments: pleuropodium "commencing in front of the base of the sheaths and continuing behind the termination of the tail."
- L. hancocki*, Norman.—Sheath-margins with 5 divisions; rhinophores little longer than the sheaths, not laminated.
- L. eisigii*, Trinchese.—Pleuropodium continuous round the body from sheath to sheath, its two lateral sections uniting at the apex of the tail and forming there a fin-like swimming-organ.

At a first glance it would seem as if specific value might fairly be conceded to the structural distinctions shown in this table. But when we come to examine into their claims more narrowly in the light of the facts brought out by the chronological survey just given, it will be seen that many of these characters lack the necessary certainty and permanence. In studying a group of soft-bodied animals such as the Nudi-branch Mollusca, endowed, and often to a high degree, with

the power of expanding and contracting their tissues and of renewing lost or injured processes, it is only too easy to fall into errors of observation even when dealing with mature and perfect examples; it is extremely difficult to avoid such errors when the material is immature and defective. I shall not be wanting, then, in respect for the authors of the splendid 'Monograph of the British Nudibranchiate Mollusca' if I express the conviction that the peculiar structure of the pleuropodium shown in their plate of *L. marmoratus* is due to an error of observation. Vérany, so early as 1845 ('Atti della Sesta Riunione degli Scienziati Italiani'), mentions the attachment of the pleuropodium to the rhinophore-sheath as one of the characters of his genus *Lomanotus*, and subsequent research has shown that this attachment is properly generic.

As for the form of the sheath-margins, this is too variable to afford a satisfactory specific character. In the Bullock specimen described at the opening of this paper, for instance, the irregularity of one of the sheath-margins was such as to make it a matter of uncertainty whether its lobes or tuberculated divisions should be taken as four or five in number (the almost simple margin of the other sheath was probably due to accidental loss of the appendages). Again, some of Mr. Garstang's specimens captured at Plymouth in 1890 had the sheath-margins produced into four, five, or six irregular processes, while of the larger specimen taken in the preceding year he says that the sheath-margin had five or six blunt prominences or tubercles, the precise number of the marginal lobes being in this case apparently as hard to make out as in the Bullock specimen. Not only does the number of divisions in the sheath-margins vary, but, as Mr. Gamble has pointed out, their form in the same individual is variable, since the tubercular lobes are capable of contraction and dilation. It seems clear, then, that *L. marmoratus*, described from a single injured and apparently immature specimen, cannot be separated as a species from Vérany's *L. genei* by any certain structural character.

The claims of *L. flavidus* to specific rank may be more summarily dealt with. It is obviously an immature form of *Lomanotus* in one of the early stages of growth described by Trinchese in his paper on *L. eisigii*, the stage when the rhinophore-sheath has just been formed, while the pleuropodium remains as yet undeveloped. It would be idle to speculate as to what final form might have been assumed by this immature specimen of Alder and Hancock. It might have grown into the likeness of Thompson's *L. portlandicus*;

it might just as well have developed into Trinchese's *L. eisigii*, and so it must be dismissed as dubious.

The obscurity in Thompson's description of the pleuropodium in *L. portlandicus* has already been pointed out. Whether the continuation of the pleuropodium "behind the termination of the tail" points to any peculiarity of structure similar to the caudal fin of Trinchese's species it is impossible to decide in the absence of a figure. The form of the divisions of its sheath-margin and the fact that they were six rather than four or five in number are in themselves insufficient as specific characters.

Apart from the number of divisions in its sheath-margin, the fourth British species, *L. hancocki*, is distinguished from previously described species merely by the form of the rhinophore, which is said to be non-laminate and scarcely longer than the sheath. There can be little doubt that in this case the rhinophores were examined when fully retracted, so that the smooth tips alone were visible, and that a dissection, if it had been made, would have shown their upper portions to possess the lamination characteristic of the genus.

On the whole, then, it appears that none of the structural features relied on as distinguishing the British species, *L. marmoratus*, *L. portlandicus*, and *L. hancocki*, from the Mediterranean species, *L. genei*, possesses the necessary certainty and constancy; and since colour *per se* cannot afford any valid specific character, the reduction to one of these four species appears to be fully justified.

So far it is easy to follow Mr. Garstang in his proposed fusion of the six species of *Lomanotus*. It is not possible, however, to go farther with him and sink Trinchese's *L. eisigii*. The peculiar modification of its pleuropodium, whose character and development are so well described by the Italian scientist, fully entitles this form to specific rank and decisively forbids its fusion with the others.

To sum up, it is submitted that the evidence adduced in the historical survey just given warrants the reduction of the six species of the genus to the two species set out below, *L. flavidus* being dismissed as doubtful.

LOMANOTUS, Vérany, Revue Zoologique par la Société Cuvierienne, tome vii. p. 303 (1844).

*L. marmoratus*, Alder and Hancock, Ann. & Mag. Nat. Hist. vol. xvi. p. 311 (1845).

*L. genei*, Vérany, Catal. degli Animali invert. marini del Golfo di Genova e Nizza (1846).

Ann. & Mag. N. Hist. Ser. 8. Vol. ii.

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*L. portlandicus*, Thompson, Ann. & Mag. Nat. Hist. ser. 3, vol. v. p. 50 (1860).

*L. hancocki*, Norman, Ann. & Mag. Nat. Hist. ser. 4, vol. xx. p. 518 (1877).

*L. eisigii*, Trinchese, Rendiconti dell' Accad. delle Scienze fisic. e matemat. di Napoli, Anno xxii. pp. 92-94 (1883).

As the name of the oldest component of the group of species here fused into one is clearly Alder and Hancock's *L. marmoratus*, that name must take precedence of Vérany's *L. genei*. It is true that Vérany all but anticipated Alder and Hancock in naming the first species of the genus when he dedicated to Prof. Gené at the Milan Congress of 1844 the nudibranch on which the genus was founded. But, however clear was his intention, he did not definitely give effect to it until 1846, when for the first time he assigned a Latin binomial to the animal.

The genus *Lomanotus* has a range in latitude of some  $19\frac{1}{2}$  degrees, from Naples to Whalsey Skerries in the Shetlands, and a range in depth from 1 fathom in West Galway to upwards of 135 fathoms in the Gulf of Genoa. The first of the two species here accepted occupies in one or other of its forms the whole range of the genus, while the second species, *L. eisigii*, so far as I can ascertain, is confined to the Bay of Naples.

In conclusion, I wish to express my indebtedness to Dr. Scharff and to Mr. A. R. Nichols, of the Dublin Natural History Museum, as well as to Dr. Daydon Jackson, Secretary of the Linnean Society, and to Mr. R. W. Scully, F.L.S., for kind assistance given me in tracing and obtaining transcripts from some of the less accessible works here quoted from.

XXI.—*List of Batrachia and Reptilia collected in Northern Matabeleland.* By E. C. CHUBB, F.Z.S.

THIS material was collected for the Rhodesia Museum during November and the first week of December, 1907, while I was on an expedition to the Kana River, about 200 miles north of Bulawayo. A considerable amount of rain fell towards the end of November, with the result that great numbers of frogs and not a few tortoises made their appearance.